THE MÜTTER LECTURES ON SELECTED TOPICS IN SURGICAL PATHOLOGY.

SERIES OF 1890-1.[1]

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LECTURE IX.

MIXED AND SECONDARY INFECTIONS.

(CONTINUED.)

SYLLABUS.—Infections complicating pneumonia; Influenza; Measles; Scarlatina; Typhoid fever; Septic angina; Mumps.

PNEUMONIA. Only during the last few years has pneumonia been assigned a place among the septic infectious diseases. This is largely due to Jurgensen. Until very recently there has been some doubt as to which of two or three well-known organisms was really the specific excitant of these cases. But enough has been already said to show that every specific infectious disease is produced by organisms whose general habits and points of attack are well known, but that no part of the body is necessarily or always secure from their invasions. And so it is with pneumonia; while in all probability the coccus with which Fränkel's name is so closely associated is the exciting agent, as shown in Lecture IV, this organism has been known to be the solitary form met with in pus from certain post-pneumonic complications. Such se-

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quelæ of pneumonia have been known for many years. Chomel mentioned some years ago that rheumatism, as he regarded it, frequently followed pneumonia as it did typhoid. Grisolle treated of arthralgias and arthritides of pneumonic patients. In the only one of four cases of extensive joint involvement in which he could make a post-mortem examination, he found the affected joint full of pus.

In 1840 Parise presented to the Anatomical Society the report of a man who, following pneumonia, had what was termed articular rheumatism of both shoulders and one knee; finally one shoulder joint suppurated with the customary local signs and, at the autopsy, there was found also pericarditis with effusion, which had not been recognized during life. About this time also Chomel expressed the opinion that rheumatism not only attacked healthy patients but those suffering from other diseases, like typhoid, pneumonia and especially the various chronic diseases. In 1850 Andral reported, under the name of sub-acute rheumatism, terminating rapidly in death, the case of a woman, æt. 67, convalescing from pneumonia of the lower left lobe, who was seized with violent pain in both shoulder-joints and the right elbow, with swelling and redness of the skin; dying eight or nine days later, pus was found in both shoulder-joints and sero-purulent fluid in the eloow. Nothing was found to betoken a purulent resorption. Gintrac has published a case in which pneumonia, pericarditis and articular abscesses were all met with. At the time those cases were published they were all regarded as of rheumatic origin. Thus Grisolle, writing in 1841 in his treatise on Pneumonia, asks, "What is the nature of these articular pains which I shall describe? Can they be considered as rheumatic, etc?"

These clinical observations were made in a previous generation, and yet have no small clinical value, for they proved that multiple joint abscesses might complicate pneumonia, and that in the first days of this complication it might be mistaken for a rheumatic affection. In all probability such cases are, strictly speaking, of metastatic origin, and are brought about by well-known embolic lesions. For instance, the section in a case of Jaccoud's showed the following condition of affairs: The right lung in a condition of gray hepatization, beset with

numerous small abscesses; the heart gave evidence of a septic endocarditis; in the cortex of the kidneys were numerous miliary abscesses; the right knee and shoulder contained quantities of pus, and near the right shoulder was an abscess in the soft parts which connected with that in the joint. The train of lesions in such a case is not difficult of recognition. Abscesses in the lungs produced endocarditis, and infected emboli from this source caused the abscesses in other parts of the system. The bacteriological investigation of this case was very interesting. In the lungs were found Friedländer's pneumococcus, along with pyogenic forms. These latter were easily recognized in the affected endocardium, and in the peripheral abscesses. They had also been found in a drop of blood taken from the patient before death. This would seem, therefore, to be a true secondary infection by pyogenic cocci according to their well-known capability of action.

Jaccoud, referring to cases of genuine croupous pneumonia which in their course presented pyæmic symptoms, found depots of pus inside the pneumonic infiltrate. In this pus, as well as in that of numerous metastatic abscesses, he has found numerous pyogenic bacteria along with Friedländer's pneumococcus. And two years before Jaccoud Naunyn (*Berl. klin. Woch.*, 1883, No. 29) had called attention to the purulent alveolar contents in cases of croupous pneumonia.

Schüller has reported two cases of monarticular joint abscess immediately following pneumonia, both of which necessitated resection. One such case has happened to myself, the shoulder being the joint involved, the abscess occurring before recovery from pneumonic was complete, perforating the joint, being evacuated by large external incision with counter opening, and so far involving the usefulness of the joint itself as to lead me to advise a resection, which, however, the patient, an elderly man, declined.

Massalonga, in Tregnago, observed an epidemic of pneumonia which was peculiarly severe throughout, and from which the mortality was about 30%. Among the various complications which attracted his attention, articular manifestations, which he called acute articular phlogosis, were quite common, but as a rule were not of severe character. Analysis of various clinical reports makes it appear that post-pneumonic ar-

thritis is usually multiple, although the shoulder is most frequently affected. It may occur early in the disease or during convalescence. The articular lesion is characterized by a burning pain coming on suddenly and spontaneously with exacerbations, and increased by pressure or movement. There is always swelling, sometimes fluctuation, often without superficial redness. A number of times pus has been found when the external appearances would not lead one to suspect its presence. Grisolle has called attention to the marked contrast between the purulent effusion and the condition of the surrounding parts, inasmuch as he met only with a trifling injection of the synovial fringes. Andral also observed nothing but an intense congestion, and Gintrac speaks of nothing but synovial redness. It is seldom under any circumstances that so much pus is observed in a joint with so few evidences of tissue alteration.

In his paper before the German Surgical Congress, before alluded to, Schüller reported the discovery of metastatic joint abscesses in five bodies thus dying from pneumonia. He carefully examined the pus from all these and recognized streptococci, as well as pneumonococci of Friedländer. There appear to have been no instances of post-pneumonic bone abscess reported, nor has the writer anything to add on this subject except that, reasoning from analogy, it would appear to be strange that their occurrence has not yet been noted, and that it need surprise no one should their occurrence be described at any time. As a matter of interest, yet not bearing directly on the present subject, it is worth while to remark that myalgias and arthralgias have been described by at least two different writers as causing a very unpleasant or distressing feature of pneumonia.

Gabbi has endeavored to produce experimentally a suppurative arthritis by injecting Fraenkel's diplococcus into the joint cavities of rabbits. When he combined the injection with mechanical irritation he got unmistakable disturbance; but the simple injection of the coccus produced only a seropurulent exudate.

Monti studied the exudate from a case of arthritis which developed in the wrist of a patient suffering from double pneu-

monia along with pleuro-pericarditis, and found a pure culture of the diplo-coccus. Belfonti had a quite analogous case, involving also the wrist, which he studied with the same result. He regarded the localization of the joint lesion as an instance of mycotic embolism due to specific endocarditis. These cases serve as a further illustration of the pyogenic power of Fraenkel's coccus.

Acute meningitis is known to be caused sometimes by this diplococcus, even though the patient at the time is not suffering from active pneumonia.

A recently reported case, of Fraenkel's, is a most interesting confirmation of this fact. A man, æt. 32, shot himself in the left temporal region; there were no brain symptoms, and the external wound closed promptly. In twenty-one days he seemed completely well. At this time he was suddenly taken with a severe chill, followed by serious symptoms, and death ensued in five days. At the autopsy a collection of puruloid material was found between the dura and the supra-orbital plate of the frontal and beneath it. Cultures of it, as well as from various parts of the intensely congested brain, from the ventricular fluid, and from blood from other parts of the body, showed it to be a case of septic infection from the diplococcus pneumoniæ. This organism in all probability gained aceess from the nose, which would seem to indicate that careful disinfection of the nasal cavity is advisable in those injuries to the bones of the skull where direct or indirect connection with these cavities may occur.

In parenthesis it may be stated that the paths of lymphatic conduction have been recently clearly traced from the nasal mucous membrane into the brain itself, and an explanation for certain brain abscesses is afforded by this statement of anatomical fact. A most interesting case lately under my own observation is one of frontal abscess following an operation for the removal of nasal polypi. At another time and place I shall report it in greater detail.

Testi has reported a case of double-sided parotitis which developed in the course of a case of croupous pneumonia, in which he found Fraenkel's diplococcus. This organism was also found in the pus from the pleura, as well as in that of several superficial abscesses from which the same individual also

suffered. Gabbi has studied some of these secondary lesions and regards the tonsils as playing a considerable *rôle* in some of them. In the ulcerated follicles, as well as in other parts of the body, he found the pneumococcus of Fraenkel, and along with it, in the tonsils, the staphylococcus aureus; both were also found in the saliva.

Zaufal has recognized the pneumococcus in the purulent discharge from six cases of otitis. He reports seven further cases of pneumo-diplococcus otitis, four of them complicated with mastoid abscesses, which were all caused by this same organism. Levy and Schrader have investigated fourteen cases of acute and two of chronic suppuration of the middle ear; in several of them the diplococcus was found.

Verneuil claims to have found Fraenkel's coccus in the pus of a subperiosteal mastoid abscess which resulted from an otitis media, and which latter was the result of an operation on the nose. It is reported also that Netter found the pneumo-coccus not less than thirty-five times out of seventy-five cases of otitis media studied.

Influenza.

The pandemic character of the spread of *la grippe* a year and a half ago caused the most intense interest in its character and pathology. Not alone to physicians was this a matter of importance, but to surgeons as well, since there resulted from it not a few cases which sooner or later came into their hands for treatment. Although I know of no satisfactory and definite conclusions as to its nature, I have seen more than one of its surgical sequelæ.

It is well known that a disease of a similar character has been epidemic among animals, especially among horses, and that inflammations of joints are a frequent complication of these cases. Indeed, upon the continent, cavalry garrisons have been almost disabled or placed *hors du combat* by reason of this, consequently it would be an oversight not to mention it among the diseases under consideration in this lecture. Arthralgias have been very common. A true serous synovitis occurs occasionally, while more destructive forms seem less

known. Witzel describes, for instance, a case of severe periostitis of the tibia, and calls attention to the similarity between this case and similar cases occurring after typhoid. He describes also a similar case involving the lower portion of the femur, in the person of a little child. He alludes also to the occurrence of necrosis as well as to the frequency of later fungus inflammations of bones and joints. At least one case of pyarthrosis, mainly of the knee, occurred under his observation, and he alludes to the fact that in the sero-purulent fluid from such a joint Ribbert had discovered streptococci. Evidently, then, la grippe is not a disease which surgeons can afford to completely neglect.

Within a week I have had to open a large subfascial abscess of the thigh, evacuating nearly a litre of pus, which made its appearance while the patient, a man of 31, was recovering from the acute stage of the grippe. He had been previously well, and had not injured himself, so far as known.

In a recent number of the Bulletin of the Academy of Medicine, an article by Verneuil shows that the influenza has been followed by a relatively large number of sequelæ, whose main pathological feature is suppuration. He has observed suppurative infections of the eye, ear, joints, pleura and pericardium, as well as superficial and deep abscesses of the skin and glands, and collections of pus in the antrum and the frontal sinus. These were treated by proper surgical measures, but seemed more rebellious than do similar lesions under ordinary circumstances. All of which is to be explained probably by the marked depreciation of the patient's general health. He also observed that patients who were in the stage of recovery from operations, when attacked by the grip, suffered from complications which were often serious. This fact was also noted by Walther of the Charité Hospital, who observed a remarkable slowness of the healing processes under the same circumstances. Cicatrization was retarded and not re-established until after complete cessation of the acute febrile symptoms.

Demons, of Bordeaux, mentions quite a number of surgical complications of the grip under his observation. Otitis complicated with mastoid abscess, severe inflammations of the eye, acute orchitis, and other equally severe lesions occured several

times. He also saw formation of abscess in the axillary glands as well as elsewhere, although none of the ordinary causes of suppuration could be found. He furthermore states that in all wounds in his wards, healing was slow and suppuration profuse. According to his opinion, during an epidemic of the grippe it is most wise to abstain from all operative procedures, and especially those involving the nasal, buccal, pharyngeal and respiratory tracts, which are especially liable to be attacked by the disease. Evidently then the prognosis of operations performed during an influenza is a matter carefully to be considered, and the wisdom of postponement of all operations, not immediately necessary, until the patient has recovered from the debilitating effects of the disease, is most apparent.

Measles.

Concerning the relation between measles and consecutive suppurative lesion, there is but little to be found in literature. Demme observed two cases of acute osteo-myelitis consecutive to measles, one a 5 year old girl who developed an abscess in the upper end of the tibia, which was opened on the 6th day after the disappearance of the eruption. She recovered. Another girl, æt. 9, five weeks after the disappearance of the exanthem, developed an abscess in the lower end of the tibia, accompanied by chills, nausea and high fever. This evacuated itself spontaneously eleven days later, and in a month she was well. It must be said of the latter case, however, that it is uncertain whether it should be put in this catagory, or was not in effect a purely idiopathic affection.

Luecke lays special stress upon measles in discussing ætiology of bone and joint diseases. He emphasizes that in the course of the disease, and especially during convalescence, the bones and joints were frequently seats of affection, and that it has been known in all ages that children who have suffered from measles very often quickly develop the so-called scrofulous appearances, which are not confined to the glands and skin alone, but frequently affect these deeper parts; and Witzel, in commenting upon the above statement, states that he knows of no one of the diseases of children which appears to furnish

so favorable soil for tuberculous processes as this, stating that scarcely a week passes without the appearance of some patient whose fungus inflammation has developed shortly after measles. (Gibney, *Med. Rec.*, June 3, 1882.)

In 1845, Bonnet in his treatise called attention to the fact that in the eruptive fevers which have pursued a somewhat irregular course, when the eruption is incomplete there appear often pain and disseminated inflammation about the various joints. In 1865, Marjolin presented to the Surgical Society the femur of a young child dying of measles, which presented all the symptoms of coxitis. Two similar cases are also spoken of by Vallette. During the same year there was a notable discussion in the French Society of Surgery concerning coxalgia, in which Verneuil claimed that measles could not be a direct cause of arthritis, but only so far as it quickly reduced the general condition of health. Ollier held that cold was largely to blame for these lesions, and that all forms of diathesis secondary to fevers appeared to be the result of the susceptibility to cold which all convalescents alike manifest. Matthieu and Strauss would explain these lesions by a tendency to hyperæmia common to all grave febrile conditions. Martin and Collineau regarded hyperinosis as playing an important rôle in the production of these complications. Follin and Duplay consider that the common suppurative arthritis might develop alone under the influence of the general enfeeblement of the constitution by which a peculiar susceptibility to external causes and especially cold was produced.

Measles and scarlatina have, in this matter of liability to secondary infection, so much in common, that it would appear proper to consider them together.

Scarlatina.

Scarlatina must be recognized as another of the acute infectious diseases, during the occurrence of which suppurative complications may arise. As in the case of diphtheria, to be mentioned, the tonsils and other adenoid tissues are so universally and so early involved that a ready and easy path of infection is afforded. This specific fever bears some resemblance to

dysentery in this respect, that sympathetic infection of serous membrane occurs very often while the occurence of ostitis post-scalatinosa is rare. It must be said, however, that tubercular joint and bone complications, as well as those of glands, are very common after these diseases, as a careful study of accurate histories of tubercular cases will invariably show. As was mentioned when considering dysentery, there appear to have been at different times epidemics of scarlatina during which serous or suppurative joint complications were very frequent. For instance, Kennedy, writing in 1843 of an endemic which prevailed in Dublin from 1834 to 1842, spoke of the frequency and malignancy of this complication. Sometimes a single joint was involved, often three or four of the larger joints filled up with pus, and sometimes even there occurred epiphyseal separation.

In these cases, at least as he described them, the internal organs revealed few, if any, changes.

But to show that this is at least unusual, Bonnet, in his classical work on the joints, stated that the rheumatic complications following scarlatina manifest no tendency toward pus formation, in which respect they were very different from those occurring during or after small-pox. According to Betz, who wrote in 1851, synovial complications of scarlatina were very common, the serous membranes being more or less affected. He took the ground that the implication of the synovia preceded the appearance of the eruption, and was not to be regarded as a secondary manifestation.

Trousseau was the next prominent writer to discuss this complication, which he constantly spoke of as a rheumatism. He described the rheumatic diathesis as affording the explanation to the condition. and said that it involved first the joint, and later the serous membranes like the periosteum and the pleura. Furthermore that it sometimes assumed the most dangerous form, viz., the suppurative, which he likened to the similar condition following the puerperal state. According to Koren, so-called rheumatoid complications of scarlatina occur in six per cent of cases. Ashby twice saw joint abscesses among five hundred cases of the fever. Post scarlatinal arthralgia appears to be not uncommon. The true arthritis

appears to begin in the second or early part of the third week, only exceptionally earlier. A simultaneous implication of tendon sheaths and bursæ has been noted in some cases.

The ordinary form of arthritis appears as a small hypersecretion of synovial fluid, and the joint may remain sensitive for a long time. It is even possible for the capsule to become so distended that a chronic hydrops results with more or less of flail-joint. Güterbock once saw spontaneous dislocation of the hip in a seven-year-old girl from this cause alone without the presence of pus, and I have seen the same thing. A contrary condition of affairs is sometimes the result of the changes mentioned above. By a combination of hyperplastic thickening of the synovial membrane, along with contraction, there is brought about a shrinkage of the capsule and a fixation of the joint, sometimes in a most undesirable position. I have had, for instance, under my observation, at least two cases of young girls whose knees were almost rigidly fixed in position near a right angle, as result of changes of this kind consecutive to scarlatina. For one of these nothing could be done; the other required open division of all the soft parts excepting vessels and nerves, and including the ligaments, down to the joint.

Trousseau, in speaking of the rheumatic or rheumatoid complications of scarlatina, with propriety assigns them a middle ground, as being less serious than those consecutive to typhoid, dysentery and gonorrhœa; but it is unquestionable that primary suppuration does sometimes occur in these joints, which naturally leads to the query whether the scarlatinal poison can give rise to pus. Just what this specific agent is we are not yet certain, consequently do not know whether to regard these cases as secondary or mixed infections. So far as I can learn in such pus none but the ordinary pyogenic cocci have been recognized.

This infection, whether secondary or mixed, is certainly at times excessively rapid. Trousseau relates a case of a young girl seized on one day with extremely severe symptoms, whose wrist was already swollen, red and painful on the second day; on the third day both wrists, a shoulder, a knee and an ankle were involved, and a blowing murmur was heard over the heart; on the fourth day the condition was in every respect

worse, fever was high and on the next morning the child died. No noteworthy lesions were found in the internal organs, but all the joints which had been involved were filled with greenish yellow pus. This cannot be regarded as a pyæmic case, but means rather that the multiple joint abscesses can be caused by some scarlatinal mixed virus acting directly. In this case the disease began with a severe angina, as did it also in both of Ashby's cases. This is of interest in connection with Löffler's experiences. He cultivated streptococci from the false membrane of a case of diphtheritic scarlatiniform angina, pure cultures of which, when injected into the circulation, caused multiple joint abscesses, from which again the same cocci could be recovered. Various clinical features appear to make it evident that the pyogenic infection which complicates scarlatina is not directly connected with it. Penetration of pyogenic cocci would seem to proceed through the affected pharyngeal tissues. This has been especially insisted upon by Bokai. In this respect then diphtheria and scarlatina stand together, as affording excellent opportunity for penetration into the body tissues and juices of pyogenic organisms through the same parts which are so severely involved. Heubner has described a case of this kind in a fourteen-year-old boy, one of whose knuckle-joints was first involved, later the knee, then the other hand, then both lower extremities became œdematous. The autopsy revealed purulent infiltration back of the right tonsil, and an extensive phlegmonous process in that side of the neck, which had extended to the right jugular vein and produced an extensive thrombo-phebitis. There was also fresh pericarditis. The joints involved were extensively disorganized. In the pus and in the blood were found Löffler's organisms. Such a case as this shows how peripheral abscesses may occur pretty directly without necessary intervention of the lungs, since Loffler's experiment showed how they might involve the joints directly from the circulating blood.

However it is not only for the favorable reception of pyogenic cocci that the virus of scarlatina prepares the joints, but equally well for the disposition and growth of tubercle bacilli. Volkmann, Bokai and others have shown how directly scarlatina appears to lead to fungous complications in the joints,

especially of the non-articular form. This occurs with especial ease in children with inherited or acquired scrofulous diathesis, in whom apparently it needs only the impression of the specific virus to call out whatever latent tendencies they are capable of exhibiting. So far as bone inflammations are concerned there should be mentioned in this connection especially the partial necrosis of the alveolar process, which Salter has so fully described under the term exanthematous jaw necrosis, which he met with as well after measles and small-pox. It affects children between the third and eighth years, and begins with pains in the jaws a few weeks after apparent recovery from scarlatina. Along with discharge of badly smelling pus a portion of gum separates, and with it one or more teeth so that the alveolar border is exposed, to be itself exfoliated a little later. According to Thomas, a similar condition of affairs takes place beneath the periosteum of other bones, the manifestations varying very much in time and intensity, appearing to be due to an exudation beneath the periosteum and its subsequent breaking down.

Indeed, he regards the majority of cases of necrosis in early childhood as due to an earlier attack of scarlatina. It appears, however, that he does not appreciate the frequency of tubercular secondary infection, and the fact that most cases of necrosis are expressions of this condition. The many instances of disease of the bone, in connection with affection of the middle ear, consecutive to scarlatina, would appear also to be of this same general character. Betz has found extensive purulent destruction of the ribs at various points. Kennedy has described epiphyseal separation. Graves has seen Pott's disease of the cervical spine, and Hauff and Hamburger have observed it in other bones. In his work on General Surgery Fischer has stated that during the course of scarlatina and small pox he had observed the most acute and serious form of inflammation in the bones of the foot, with formation of a fluctuating tumor, inside of which these bones lay almost completely loosened from their periosteal and other connections. He lost three young patients from trouble of this kind inside of eight to fourteen days. Of course, this is not to be regarded as the direct effect of scarlatina, but rather as

brought about by a secondary pyogenic infection. In general we wish to emphasize that most of the cases of necrosis ascribed to scarlatinal poison are really the result of a fungous ostitis, usually of tubercular character, with consequent caries or necrosis, the whole being due to easy secondary infection with tubercle bacilli in ground already poisoned and prepared by the scarlatinal virus.

Barwell, speaking of the joint complications of the exanthematous diseases, says: "These affections have often, like gonorrhœal joint maladies, been ascribed to rheumatism, even have been termed consecutive rheumatism; but the only point in their course and condition which at all resembles the rheumatic, is that they are nearly always multiple; they possess neither the temperature of rheumatism, nor the slightest tendency to involve the membranes of the heart or brain."

Barwell states the case about as follows: "The joint affection following scarlatina tends more often to the suppurative form, and to produce, if the attack be at all severe, either disorganization or anchylosis very rapidly. The synovitis which follows measles is, more than any other of these secondary inflammations, inclined to fall into the chronic phase after a subacute attack of a few days, and then to give rise to or become changed into strumous synovitis. This tendency of strumous inflammations to follow measles is not confined to joints, but may also be observed with regard to cervical lymphatic glands, palpebral conjunctiva, auditory meatus, etc." * * * "But sometimes an exanthematous synovitis is empyæmic and patients die of such disease consecutive to one of the skin fevers, and then the joint affection, considered merely as a symptom, is barely mentioned. Such mortality only occurs when the pristine malady leaves behind it some suppurative focus, such as pharyngeal ulcer from scarlatina, measles or typhoid, one or two obstinate sores after small-pox, suppuration of the parotid after mumps, a meso-rectal or meso-colic abscess after dysentery, etc. Here the origin of the infection continuing, the infection itself goes on. Another, a monarticular form, is likewise said to occur as a sequel to exanthemata or to dysentery. This, however, must be extremely rare for all such dis-

eases. I have never seen a case of exanthematous synovitis commencing in a single joint."

Three pretty distinct forms of severe complications of scarlatina have been distinguished: *a*, Common acute serous arthritis, which has often been spoken of as a scarlatinal rheumatism; *b*, a serous arthritis which passes into a suppurative form, and *c*, arthritis which is purulent from the beginning, and is accompanied by the ordinary phenomena of purulent infection. The first form appears usually at the end of the second week, or at or about the period of desquamation; but few joints are involved, the wrist most commonly, and next the knees and ankles. Graves has reported four cases of localization in the joints of the cervical vertebræ. Pains, sensitiveness and swelling are moderate. Bokai has described a subacute form which often leads directly to white swelling, but he thinks, andwith reason, that the scrofulous diathesis predisposes to this condition. The second form is regarded by Kennedy Corrigan and others as the more frequent. It begins usually as a small polyarthritis whose attending symptoms, such as fever and swelling, increase in severity as the serous fluid is transformed into purulent. According to Bokai this disease terminates most often in death, or when patients recover they are usually found to have anchylosis of the affected joints. The third form is hardly peculiar to scarlatina, but is met with in various severe infectious diseases. Hebra and Kaposi have described rare cases of purulent arthritis produced by perforation of peri-articular abscesses, and latter these writers have considered these as due to embolic processes, such as are common to phlegmons of the neck, thrombosis in the cervical veins, gangrene of the pharynx, etc. This form is almost invariably fatal.

Babes ("Concerning Septic Processes in Children") has made a most important contribution to the subject of mixed infection. His researches are based upon systematic bacteriological investigation of the material from 112 autopsies on children. The majority of cases were of a septic character following scarlatina, diphtheria or external injuries. The existing agents of the septic infections appear to be less often individual forms than a mixture of two or more species.

Among these the pyogenic and the saprogenic forms were, of course, most common. The latter frequently resembling those from the intestine, appeared to have penetrated into the tissues, and to have there displayed pathological activities. A third group of these forms was constituted by those peculiarly septic bacteria in the sense in which Koch has described them. Babes has succeeded in cultivating not less than eight of these species (among them the rabbit-septicæmia bacillus of Koch) from the organs of children dying from septicæmia. Of particular importance is Babes' view concerning the relations of streptococcus pyogenes to scarlatina. This disease is, according to his view, always accompanied by these cocci, and, indeed, the whole scarlatiniform process may be regarded as a modified streptococcus infection. The nephritis in scarlatina, for instance, would thus appear to be an invasion of this organ, since it is almost constantly found in the affected kidneys. It is of peculiar interest in this connection to realize that the cocci cultivated from the less acute or more chronic forms of scarlatina evince much less violent activities than those recovered from the more rapidly fatal cases. In other words, they appear to have a lesser degree of virulence after cultivation on artificial media.

Babes separated a streptococcus septicus liquefians from putrid bronchitis and pulmonary gangrene after scarlet fever, as well as one corresponding to Hauser's proteus, which he found in the lymph spaces of the mucous membrane in a case of dysentery.

Marie Raskin has found streptococci in numerous cases where abscesses have complicated scarlatina. The pus from these abscesses as well as from the joints was often almost a pure culture of this organism, while in pus from the middle ear, staphylococci and streptococci were mixed. Streptococci were twice found in the blood of living patients, and twice in that from the cadaver. In 64 cases uncomplicated with suppuration, no streptococci were found in the blood. Twice out of 18 cases examined streptococci were found in the skin and in the desquamated scales. She comes to the conclusion that streptococci are the active agents in secondary purulent infection after scarlatina; but that they have nothing to do with the

fever itself. She concludes further that the inflamed tissues in the throat are the ports of entry for these infective agents. (*Ctrbl. f. Bact.*, V, 1889, p. 286).

Lenhartz found in a severe case of scarlatina, accompanied by abscesses in the neck and joints, as well as by a diphtheritic condition of the pharynx, a streptococcus, which by experiment upon animals he identified as the streptococcus of erysipelas. (This has been already shown to be identical with the streptococcus pyogenes). He too regards the pharyngeal mucous membrane as the port of entry, and in this case the intense inflammation which it showed he considers to be a modified erysipelas of the mucous membrane; Heubner having already described a genuine erysipelas of the face following scarlatina and diphtheria of childhood. (*Jahrb. f. Kinderheilk.*, Bd. 27, 1888).

Typhoid.

Although in such masterly works as those by Liebermeister and Murchison, joint and bone complications find no mention as sequels of typhoid, they have long been recognized by surgeons. The names of some of the most eminent surgical writers are connected with the study of typhoid and post-typhoid articular lesions. Boyer, for instance, observed spontaneous dislocation of both thighs after an "essential fever." Post-typhoid hip dislocations have also been reported by Roeser and Stromeyer, by Hueter and Volkmann. The matter of spontaneous luxation and other joint affections subsequent to typhoid, was prominently brought before the Congress of German Surgeons by Gütterbock. While these serious joint disturbances are fortunately rare, some men of large experience having never seen one, they are, nevertheless, common and serious enough to demand recognition, and they have moreover most interesting pathological features. Strange to say, so-called rheumatic affections of joints occur very much less often after typhoid than after dysentery. Still I am sure that many practitioners can recall patients who have entirely recovered from typhoid, who have yet complained of more or less painful joints for some time after. Several of the French

writers have recognized this in the terms typhoid arthralgia and myodynia. It is scarcely necessary to say that a true combination of rheumatism and typhoid occurring simultaneously, is scarcely or not at all to be thought of. Secondly, there is underlying the term post-typhoidal rheumatism, such an impossible condition of affairs as to forbid its use or that of anything equivalent to it. That the mistake is usually made, such a case as the following, quoted by Gütterbock from a report of Simons, will indicate: A patient, æt. 19, suffered from swelling of both ankles, and was supposed to have a severe form of acute rheumatism; not until after due recognition of a typical temperature curve and enlargement of the spleen, and of petechiæ, was it discovered that he was in reality suffering from typhoid fever, and that the joint swellings were merely an unusual manifestation of the typhoid poison.

It is somewhat *singular* that when such serous effusions as those into the pleura and pericardium are generally recognized as possible complications of this disease they should be regarded as so occult when they occur in synovial cavities. Volkmann and Keen have alluded to a polyarticular form of the same condition, which we may call post-typhoidal serous arthritis. Multiple joint abscesses have been more rarely seen, and when present have generally led to or been connected with the pyæmic condition. Nevertheless Gütterbock has reported the following case of recovery from this most serious condition: A young woman was admitted to the hospital at the end of the second week of the typhoid fever, which had been of only moderate severity. During the fourth week there was a hypostatic pneumonia with bloody sputum, and then for several days she had repeated chills. During these there occurred an acute painful swelling of the left shoulder, which improved under the application of ice. The chills continued, and two days later the left hip was similarly affected. Two days later the chills ceased, and she slowly recovered.

A case of Robin's shows how pus may be collected not only in the joints, but in the tendon sheaths and bursæ, as well as in the cellular tissue at some distance. Doubtless such a case as this implies mixed infection, the primary infection being by typhoid bacilli, the second with pyogenic cocci.

Investigations of Brieger and Ehrlich concerning the relation of malignant œdema to typhoid have shown very plainly that various bacteria, which in the healthy body would produce no disturbance at all, find a more or less unresisting organism in the individual whose vitality has been lowered by an attack of typhoid fever. It is not difficult to see then how pyogenic bacteria may penetrate through the intestinal walls or by the air passages, or from the tonsils or teeth, without meeting with that resistance which they would surely encounter in the healthy body. Thus they allude to streptococci which they found in an abscess produced by breaking down of an axillary lymph gland during the course of a fever. According to Brieger, suppurations during the course of typhoid are rare, but Dunin claims to have found them in a fourth of all his patients. He found the pyogenic cocci in all of the cases which he studied, and regards the ulcerated and necrotic patches in the intestinal canal as their port of entry. With everything so predisposing to metastatic infection and pyæmic condition, it is very strange that it has not been more often met with.

Post-typhoidal monarthritis as well as polyarthritis possess great interest for the surgeon, especially when they may run so severe and destructive a course as to lead to spontaneous luxation. One may easily see, indeed, how this subject may possess a medico-legal interest, since, if it occur in a patient already maniacal or delirious, it might lead to supposition of violence on the part of the attendant, which would have nothing to justify it. In fact Schotten has reported a case where such a dislocation occurred while a nurse was raising a child. The best exposition of this part of the subject was made by Roeser, in 1857, who ascribes it principally to distention of the capsule by a fluid effusion from within. In a patient of Stromeyer's, æt. 61, the capsule of the hip-joint was so distended that fluctuation could be easily recognized in the groin. When these dislocations have spontaneously occurred they have usually been at the hip. Very rarely the shoulder has suffered. In fact I believe there are but two such cases on record, one by Meyerhoff, the other by Keen. Keen also has reported one such dislocation at the knee. It is usually

the monarticular form which ends in suppuration, and it is quite possible for functional recovery to occur when such an empyema of the joint is radically treated by incision, irrigation and drainage. In the pus from such a joint typhoid bacilli are sometimes found, but most commonly the ordinary pyogenic forms alone. That more extensive destruction than that of the capsule may take place is illustrated by the case of Weil, in which there occurred not only suppurative coxitis, but a separation of the upper margin of the acetabulum, with, of course, consecutive dislocation of the hip. Fortunately in this case a very useful joint was secured by treatment with traction; which justifies an observation of Bell's that a complication of dislocation with suppuration in the joint was favorable rather than unfavorable.

In 1878 Robin reported a very interesting case of adynamic typhoid fever in which on the eighth day there rapidly supervened a purulent synovitis of tendon sheaths, of multiple periostitis, and finally of suppurative synovitis involving numerous joints. The patient succumbed on the twenty-third day.

It is mostly toward spontaneous dislocation that the non-fatal cases of suppurative arthritis tend. Out of forty-three cases Keen met with thirty spontaneous luxations, twenty-seven of these in the hip, two in the shoulder and one in the knee. Roser was of the opinion that a large proportion of spontaneous luxations in children which were considered as due to rheumatic affections were really of typhoid origin, and Lannelongue has reported three new cases corroborating this view.

The phenomena which precede the occurrence of luxation are variable; for the most part they are symptoms of intense arthritis. On the other hand it does not seem essential that a large amount of effusion should first occur. The explanation of which fact is simple if we admit that the intensity of the disease occurs in the epiphysis and not in the joint. Especially is this the case at the hip when the acetabular side of the joint is involved, and if true, this will explain the difficulty or virtually the impossibility of permanently reducing these dis-

locations, since, as mentioned by Keen and others, they are almost impossible of retention in place.

So far as suppurative lesions in the bones are concerned, our knowledge is very much more recent. Indeed this is almost a matter of the last ten or fifteen years.

Konig mentions in his text-book that he has often seen small abscess in the tibia after typhoid. In a dissertation published in Zurich in 1868, Cerenville mentions inflammation of bone as a sequel. In 1872 Meusel operated with success upon a necrosis of the skull consecutive to typhoid. Paget's papers in 1877 and 1878 were a valuable contribution to the subject. But perhaps the most elaborate paper on the subject came from the pen of Dr. Keen in 1878, who collected thirty-nine cases; but the explanation which he put forward, of thrombosis or of occasional embolism, must lose a part of its force and attractiveness in the light of the bacteriological knowledge of to-day. Still later a French military surgeon, Mercier, brought forward a dozen new cases of bone inflammation during typhoid without the occurrence of sequestra such as Keen had reported. Since then numerous observations have been made by Levesque, Ronda, Gelez, Turgis, Hutinel and Terrillon, and the writer has added his mite to the same subject.

Inasmuch as this topic has been of late carefully studied in its biological aspects we may now say that there is no such thing as post-typhoidal rheumatic affection of bone or joint, but all such cases are to be ranked either as primary or mixed infections, whether occurring in bone or joint cavities, and that while in a few instances the pus therefrom has been found to be almost a pure culture of typhoid bacilli the majority of these cases are genuine mixed infections. With the occurrence of these suppurative foci in these particular structures we must not forget how often they may occur in other parts of the body where they are better concealed or less suspected; and this leads us to the observation, in parenthesis, that no small proportion of patients dying from typhoid fever undoubtedly perish from the presence of collections of pus which, not being recognized, lead to a fatal result by ordinary septic processes. It is scarcely necessary to rehearse in detail

the now numerous cases of sub-periosteal, intra-osteal and intra-articular abscesses following typhoid, whose pus has been carefully studied, and in which typhoid bacilli have been recognized.

Barwell (Chapter IV of his "Treatise on Diseases of Joints") mentions that one of his colleagues, Bellamy, had to excise the hip of a boy, æt. 11, who had suppuration of that joint occurring in the course of a typhoid fever. Barwell further alludes to two different forms of joint abscess; one, which is mostly confined to the hip, is intra-articular, and produces rapid effusion and dislocation. It is usually so painless, or the patient is so apathetic, that the condition is not infrequently recognized only when the patient is convalescent and about to quit the bed, when luxation becomes evident. "The other form is multiple, begins toward the end of the second week, and occasions more suffering; tenderness and pain on movement are especially strongly developed; the swelling is marked by considerable cutaneous redness and peri-articular abscess threatens constantly, yet may disappear; œdema of parts beneath the inflamed parts is strongly accentuated."

All that has been said in previous lectures concerning the peculiar predisposition which the anatomical structure of these parts affords with reference to acute osteo-myelitis, etc., will apply equally well here. The arrangement of the deeper periosteal layer, and the proximity of the epiphyses, have their inviting effect.

Statistics show that in at least two-thirds of these cases individuals are affected during adolescence or in early childhood. Undoubtedly, then, we have to seek for the predisposing causes in the nature of the osseous tissue itself, and we shall find it, as in the case of acute osteomyelitis, very favorably predisposed. It is an accurate general statement to say that during the period of active growth, the very lively circulatory activity of the deeper periosteal layer, and the neighborhood of epiphyseal junctions, predispose to this form of local specific infection. Typhoid fever appears to bear a peculiar relation to the growth of the bone, since it has been noticed that during typhoid fever or after convalescence, there has been an extraordinarily *rapid growth in length, as much even as*

one mm. a day. This is most probably caused by the irritation of the typhoid poison upon the osteogenetic tissue.

In this connection, also, it will be remembered that convalescents suffer from peculiarly active and frequent "growing pains," with frequently a marked tenderness upon pressure in the bones involved. Furthermore, Ponfick, Litten, Orth and Gosselin, have found, in the bone marrow of those dying of typhoid, hyperæmic areas at the points above mentioned, which were almost inflammatory in appearance. Therefore, it is not strange that at these points invasion of infecting bacteria may be most marked, or that when they are thus involved a second pyogenic infection is much easier. This mixed infection must necessarily always lead to abscess formation; but these abscesses are not necessarily confined to bones or joints. Schede (*Munch. Med. Woch.*, 1888, No. 11) has called attention to the suppurations which occur during and after typhoid, in the glands, muscles and in goitrous enlargements, as well as in the osseous system. During one epidemic he saw ten cases of bone abscess; two of these were in the mastoid process, two in the humerus. In the pus from these abscesses he found always pyogenic cocci, but never typhoid bacilli. Several others have shown that recidive of suppurative trouble may occur. They have also shown that the head of the tibia is the most common site of such trouble. Another very curious feature of this subject is that upon which Witzel has laid considerable stress. He calls attention to the relative infrequency of these complications until within a few years; also to the fact that within the past few years the treatment by baths has been much more widely adopted, and he queries whether injuries to the limbs of the patient upon the sides or edges of the bath-tubs, or the sides of the beds, may not have considerable to do with their origin. Such injuries are naturally very slight, but he thinks the irritation may be sufficient to produce a deep abscess.

When these post-typhoidal complications occur, they are much more often acute than chronic. It is possible to have a very acute non-suppurative form of post-typhoidal periostitis, as a case in the writer's practice will show.

This was a young lad of 14, who developed a most intense and painful multiple periostiiis during the end of the third week of an ordinary attack of enteric fever. He recovered finally. All the bones of both lower limbs, as well as the pelvis and several vertebræ, were involved.

But a long persisting thickening of the periosteum is very rare.

With reference to the discovery of typhoid bacilli in pus from these sources, it is well to recall what Eberth himself said about their frequency. As a matter of fact the bacilli are most numerous during the first twelve days of the disease, and from that time till the end of the third week they diminish quite rapidly in numbers, and during the fifth and sixth weeks they are only exceptionally to be found. Ebermaier's discovery of quantities of typhoid bacilli in apparently healthy bones of typhoid patients, and especially in a non suppurative periosteal swelling in the same cases, is of very great importance, especially in connection with such instances as that above reported by myself. This author alludes to the similarity in tissue and function between the spleen and bone marrow, and regards it as not at all strange that the bacilli are frequently to be found in the latter. He also succeeded twice in finding the bacilli after incision into a so-called rheumatoid swelling of the periosteum. Such discoveries as this must serve as corroborative evidence of the position taken in Lecture IV, that typhoid bacilli may at times have pyogenic activities, but are not to be regarded as belonging in the obligate pyogenic group of micro-organisms.

It is no harder to think of secondary infection with pyogenic organisms, as the true cause of most of the suppurations met with as post-typhoidal complications, than it is to regard them as secondary but active agents in causing most abscesses in tubercular tissue or in syphilitic gummata. There is another class of lesions met with in these cases where there forms a collection of broken down puruloid material. This must often at least, if not always, in the absence of other organisms, be regarded as the product of a retrogressive metamorphosis, or degeneration of cell elements thrown out to protect against the typhoid bacilli. This form of lesion is frequently met with between periosteum and bone, and it is in such instances that

the bacilli in question occasionally manifest pyogenic activity. A clearer recognition of the occurrence and clinical course of these complications would enable one to properly catalogue them, and not be at a loss to account, for instance, for what must, at first, appear to be an idiopathic acute osteomyelitis as a sequel of a severe zymotic disease.

But there is so much to be said in this matter concerning typhoid alone that, to make such an essay reasonably complete would take more than two whole lectures. I must, therefore, fall back on my expressed intention of being suggestive only in this rehearsal, and consequently desire to bring together a few observations of widely scattered investigators, all of which point in the same general direction. Take, for instance, the fact reported in the *Deutsche Med. Woch.* for 1890, No. 48, p. 1086, where it is shown how typhoid bacilli have been found alive in the tissues and capable of active growth *seven months* after cessation of the fever.

The investigations of Senger, too, will help to explain mixed infection after typhoid. A patient died of a post-typhoidal, acute, varicose endocarditis. In the lesions on the heart valves there were found no typhoid bacilli, but quantities of streptococci, which latter were also found in the swollen mesenteric glands. Senger regarded the intestinal ulcers as the ports of entry for the streptococcus infection, remembering that such invasion of typhoidal ulcers by pyogenic and other cocci has been often met with, and that Gaffky has found them often in the mesenteric glands, and in one instance in various internal organs.

Fraenkel accepts without reserve this possibility of secondary infection, and found in one case the spleen swarming with "pneumonie-ahnlicher" cocci, which were extremely pathogenic in guinea-pigs. The invasion occurred after the formation of dysenteric ulcers resulting from abuse of calomel.

Rheiner observed, in Zurich, during the typhoid epidemic of 1884, six cases of erysipelas during the course of the typhoid. Two of these were fatal. In the erysipelatous skin typhoid bacilli were also found.

Foà and Bordoni-Uffreduzzi found almost pure cultures of

typhoid bacilli in the lung juices from the hepatized lung of a typhoid patient dying with croupous pneumonia.

Klebs found typhoid bacilli in the purulent exudate from the pia in a case of cerebral complication of typhoid.

Dunin had numerous opportunities to observe suppuration and phlegmons in various parts of the body after typhoid. He found only pyogenic cocci, and considered that they had invaded the tissues *via* the alimentary canal.

Ponfick found in the bone marrow of many patients dying of typhoid numerous changes, and Freund has concluded when the bone is thus involved, as a sequel to the fever, that the affection has its origin in the marrow and subsequently spreads to the periosteum. It is likely also that the joint pains of which many of these patients complain are a milder expression of a similar trouble.

A. Fraenkel (*Deutsch. Med. Woch.* 1887, No. 6, p. 101) has made a careful study of the necrobiotic processes which sometimes affect the upper air passages of typhoid patients. Wagner and Cohn had described a form of angina which they regarded as a specific manifestation of typhoid. Fraenkel insists, and with justice, that if this is a specific angina typhoid bacilli should be found in the lesions; whereas they never have been found. On the contrary, they are secondary infections with other organisms. He shows how exposed to secondary infections these parts are. These changes are much more of a character described by Eppinger as *necrosis epithelialis mykotica*, and the staphylococci are mainly to blame.

At the last Congress of French surgeons, in March, 1891, Panas spoke of a case of orbital angioma which of itself is rare, but which in this case presented features of unusual interest. The lesion had begun at the age of two, and under treatment had somewhat protruded. Vision remained good until the age of eight when the patient suffered from typhoid fever. She then presented a phlegmonous inflammation of the orbit, which necessited enucleation. He then found a small tumor, deeply seated, which contained pus. This pus was examined and found to contain typhoid bacilli, so that he had to deal with a spontaneous endo-infection of an angeioma by this specific bacillus.

At this last Congress of French surgeons, also, Panas reported that he had met with five or six cases of endo- or secondary infection consecutive to influenza.

Stern and Hirschler (*Wien. Medicin. Presse*, 1888, No. 28) have reported one case of suppurative parotitis following typhoid, in the pus from which both staphylococci and streptococci were found. Also one case of croupous pneumonia in a consumptive patient in whose sputum tubercle bacilli were found. Also a case of puerperal mixed infection, occurring nine days after confinement, along with high intermittent fever, with exudate around the ovaries. Seven weeks afterward the patient displayed a left-sided empyæma which perforated the lung three weeks later. Three days before this perforation streptococci and staphylococci were found in the blood, which must have been invaded from puerperal infection.

Hanot has collected four cases of orchitis during typhoid fever, one of which ran on to suppuration. Liebermeister alludes also to the same thing. It seems also to be a fact that at certain medical stations orchitis is known to follow on a fever whose nature is somewhat doubtful, some considering it remittant and others typhoid. It most often occurs during convalescence, and is often accompanied by rheumatic pains The same is true of ovaritis.

Neve, speaking of abscesses of soft tissue which occur as sequelæ of typhoid, alludes to a minute lesion often found in mesenteric glands, spleen and liver. This, which is of the nature of a localized cloudy swelling, he believes to be infective.

Diphtheria.

Diphtheria belongs also to the maladies which may be accompanied or followed by severe complications in bones and joints. That it is frequently followed by abscess is so generally recognized as scarcely to call for comment here. In this place we intend to allude to those lesions which are produced, perhaps, primarily by the bacilli of this disease, or mainly secondarily by the common pyogenic and other cocci in the shape of mixed or secondary infections. Considering the well-known lymphoid character of the tonsils and neighboring adenoid tissue which is so universally affected in this disease, it is not difficult to trace a possible path of infection and one which is apparently more commonly followed than that origi-

nating in the intestinal canal, and discussed in previous captions. Here, again, from ignorance or failure to read correctly, too many of the joint affections consecutive to diphtheritic angina have been regarded as rheumatoid in origin. The thought comprised within this statement is not intended to be confused with another that may come at once to the reader's mind, that in many cases of genuine rheumatic trouble, or more commonly of gouty trouble, there appears to be a sympathetic infection of the throat or possibly in the muscles of the neck. It has been widely recognized that, after many of the more malignant forms of diphtheria have resulted fatally, multiple abscesses have been found in the liver, the spleen and the lungs, as well as in and around the bones. This would betoken a termination by true pyæmic processes, which yet have not been permitted time in which to produce a secondary crop of metastatic abscesses in the joints and other organs. No allusion is intended in this caption, either, to simple œdematous infiltration of the soft parts or limbs, by which a swelling may be produced in the neighborhood of certain joints, nor even to a simple serous effusion into the joints themselves. Such manifestations may be produced at almost any time as the result of the more pronounced forms of nephritis. These are not mixed infections in the sense in which we are using the term, although they cause many local appearances which might easily be mistaken for those of genuine idiopathic and rheumatic attack. There are undoubted cases on record where patients have succumbed to, or have recovered from a series of multiple abscesses in or around various joints, which perhaps were of a truly metastatic character, following closely upon, or occuring during attacks of diphtheria, whose pharyngeal symptoms varied in intensity in different cases. Schuller, in five different bodies of those dying of diphtheria, found various cocci in the serous effusions or fluid from the joints. ("Transactions of the German Congress of Surgeons, 1884, Vol. 13).

Fungous inflammation of joints as a sequel of diphtheria is not rare, as the experience of most physicians will show. As a rule, it runs an acute course, at least in the beginning, but usually terminates after a fashion relatively favorable to the

patient. Perhaps such cases are to be regarded as a conflagration by tubercle bacilli, permitted by the well-known lowering of vital resistance which diphtheria always produces.

Pauli, in the course of an epidemic of diptheria, observed twice out of twenty-seven cases a very rare exemplification of multiple arthritis which he attributed directly to the action of diphtheritic virus on the synovial membrane. One of the patients was a lad of fifteen, the other a child of thirteen. The inflammation involved nearly all of the joints, including even the temporo-maxillary and costo-sternal. Although both patients recovered the articular complication lasted for a long time. The clinical findings in that one of his cases in which one of the temporo-maxillary joints were involved, along with others, suggest to the writer the possible explanation of some of the complications of diphtheria and scarlatina, in which the source of the principal local infection is in intimate relation with this joint. While I have no data at hand to show that this is exactly the case, yet it is not difficult to understand how, from an infection of one of these joints, metastatic complications might very easily occur, to say nothing of the anchylosis of the jaw which is known to sometimes result.

Septic Angina.

For some years certain authors have referred under this name to a complex pharyngeal disease which seems to lead so rapidly to a fatal result as to make us think that we have to deal in such cases with a veritable septic intoxication. Verneuil and Landouzy have reported interesting observations on this subject, and have remarked upon the inter-relations betwen these lesions and articular or renal symptoms. Lapersonne reports, for instance, the case of a man previously healthy who, fifteen days before the appearance of phlegmonous angina, had suffered from a large ulceration in one tonsil, and who evinced exophthalmus and severe cerebral symptoms. He died shortly after and the autopsy revealed the existence of a suppurative phlebitis of the ophthalmic veins and the dural sinuses. *Apropos* of the cases of angina which accompany albuminuric nephritis, Landouzy asks if the tonsils may not furnish a port

of entry for such infection, since it is of course well-known that this complex sebaceous organ, developed upon a mucous basis, is in intimate relation with lymphoid tissue and lymphatic vessels. Other French writers have reported such cases as the following, for instance: A suppurative arthritis of the wrist consecutive to an infectious pharyngitis, which had been regarded at first as a case of glanders. Puncture revealed only the ordinary bacteria, and inoculations upon animals produced no septic lesion. Another case of very severe angina accompanied by high fever in a patient who some days later was seized with intense pain about the wrist, followed by signs of very severe local infection. A little later peculiar phenomena appeared about one knee. He fell into a typhoid condition, was delirious at night, and his condition gave rise to the greatest alarm. Free incisions were made, and antiseptic irrigation practiced, with good result.

It has happened to me in my own practice to see one case of very serious cynanche tonsillaris, with accompanying suppuration in and around the tonsil and pharynx, where we stood ready for hours to make tracheotomy for relief of threatened suffocation, in which an extensive abscess developed about one knee, with two smaller ones near the lower part of the leg. This was before pus had ever been studied bacterologically, so I can say nothing further about it than that it offers probably a case of secondary infection,

Mumps.

The infectious character of mumps is probably not questioned to-day. Its contagious and epidemic characteristics compel its classification along with the general infectious diseases. Capitan and Charrin even claim to have cultivated its microbe, to which they ascribe specific properties, although their claim is not yet generally recognized. They have found it, in the blood and saliva, as a bacillus two to three micromillimeters long, very motile and capable of cultivation, but they cannot reproduce the disease with it.

In the course of this disease, as in that of other infectious diseases, we frequently observe various pathological manifesta-

tions, while orchitis, ovaritis, stomatitis, enlargement of the tonsils and spleen, and albuminuria are most commonly associated with it. Articular or peri-articular complications have been noted by several writers. Thus in 1850 Rilliet reported the case of two brothers whose attacks of mumps were rapidly followed by what he described as acute rheumatism. Later Begeron reported a case of bursitis of the præpatellar bursa. In 1877 Gailhard cited two cases; the first a soldier æt. 21, who had double parotitis on the right side, epididymitis with in tense headache, and arthralgia; the second a sailor whose ankles and wrists were seriously involved during convalescence from mumps. Jourdan watched an epidemic of mumps in a battalion of chasseurs. Four of them were, toward the end of the disease, seized with severe articular pains in various joints for which they asked their discharge from service. Boisset published under the term pseudo-rheumatism the case of a soldier recovering from a mild attack of the mumps, who, about the twelfth day, was seized with severe pains in many of the joints, which a little later seemed to localize themselves in the sheaths of the common extensor of the fingers, in the extensor of the index finger and the extensors of the thumb of the right hand. The tendons were also apparently involved, the pain was more severe at night and increased by pressure or movements. There was no particular change for eight days, then rapid amelioration for three days, after which relapse occurred. Hydrarthrosis of the knee also appeared; finally the patient completely recovered.